

Unit 2:
Functions, Relations,
and Their Graphs

2.1

1/17/14

Give the general and vertex forms of the equations for a circle and a parabola.

What do these terms mean?

Function

Relation

Independent

Dependent

Variable

IWBAT identify the independent and dependent variables in a function, define and compare a function and relation, and determine the number of outputs for a given real-world problem. I will capture my thinking using the math note catcher including teacher and student-team modeled example problems on the Promethean board. I will demonstrate my understanding on my exit ticket.

Function

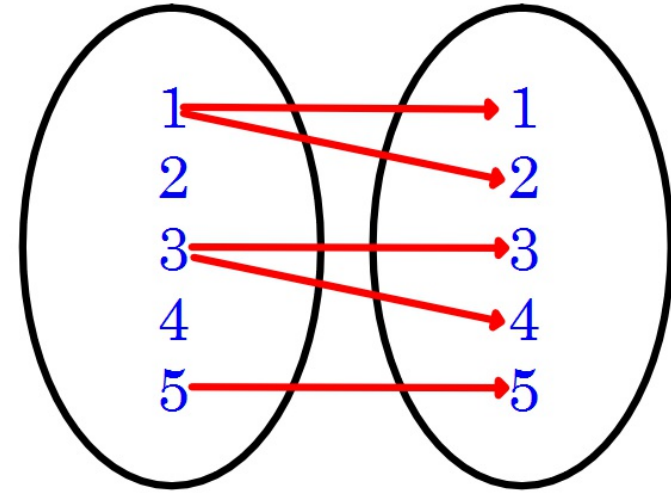
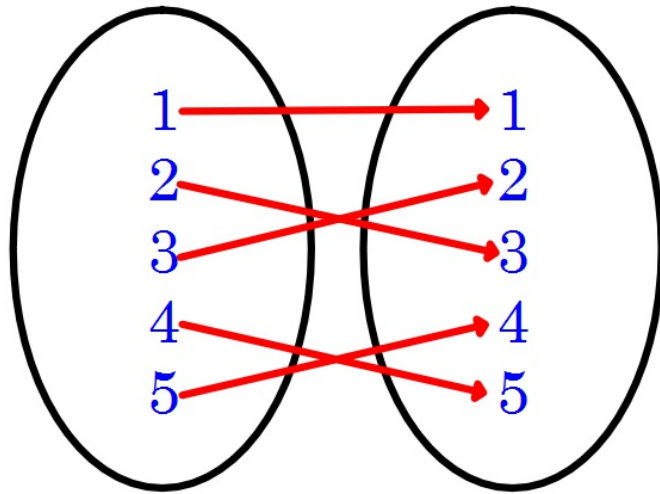
x	y
3	9
2	4
1	1
0	0
-1	1
-2	4
-3	9

Function

x	y
9	3
4	2
1	1
0	0
1	-1
4	-2
9	-3

Relation

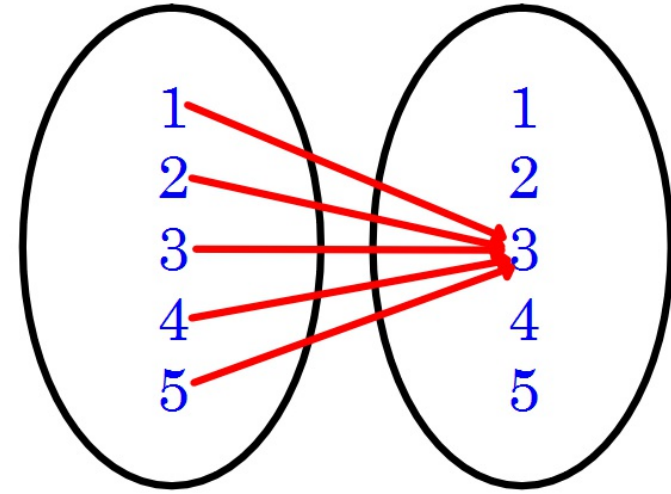
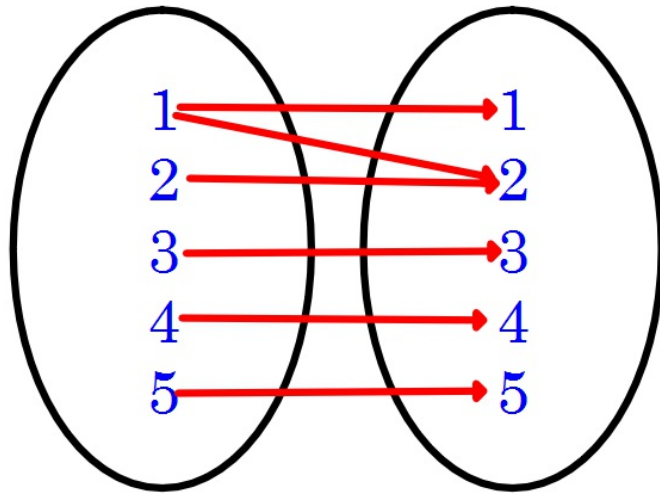
IWBAT identify the independent and dependent variables in a function, define and compare a function and relation, and determine the number of outputs for a given real-world problem.



Function

Relation

IWBAT identify the independent and dependent variables in a function, define and compare a function and relation, and determine the number of outputs for a given real-world problem.



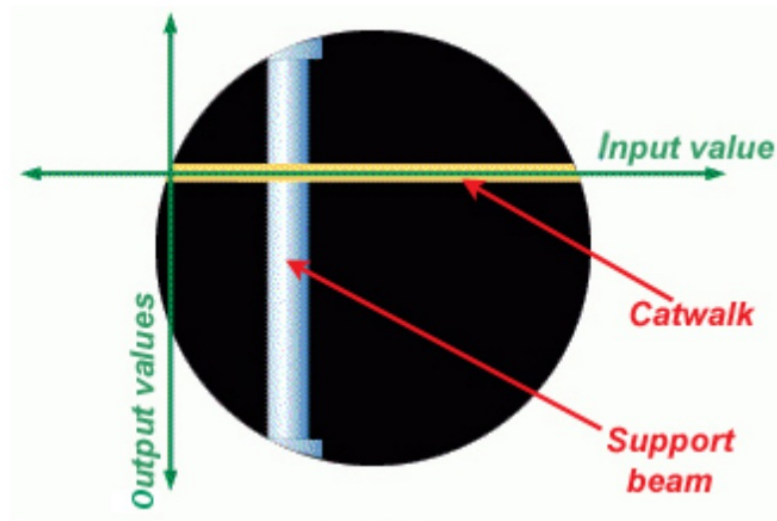
Function

Relation

IWBAT identify the independent and dependent variables in a function, define and compare a function and relation, and determine the number of outputs for a given real-world problem.

2.1 The catwalk problem

1/17/14



IWBAT identify the independent and dependent variables in a function, define and compare a function and relation, and determine the number of outputs for a given real-world problem.

Dependent (Independent)

1) The value of certain antique furniture depends on the year in which it was made.

2) The height of a certain type of tree depends on the amount of sun it receives per year.

IWBAT identify the independent and dependent variables in a function, define and compare a function and relation, and determine the number of outputs for a given real-world problem.

How many salary outputs does the chart have for each input value of training?



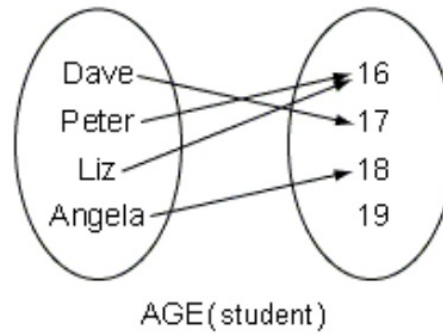
Hours of Training	Monthly Salary
10	1100
20	1200
30	1300
40	1400
50	1500
60	1600
70	1700

IWBAT identify the independent and dependent variables in a function, define and compare a function and relation, and determine the number of outputs for a given real-world problem.

2.1

1/17/14

Complete quiz 2.1.2

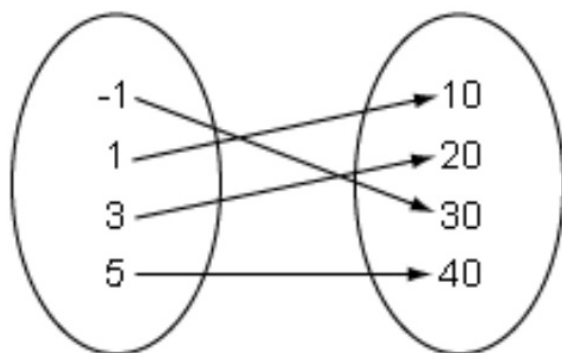
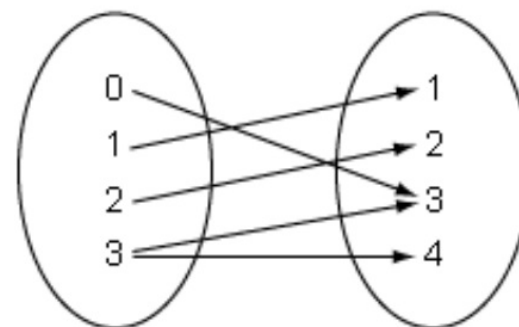
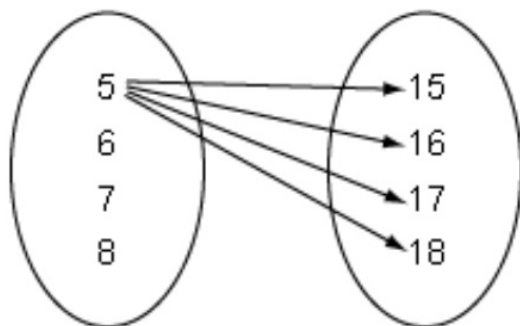


1. According to the mapping diagram, what is AGE(Peter)?
2. According to the mapping diagram, what is AGE(Dave)?
3. According to the mapping diagram, what is AGE(Angela)?

2.2

Determine how inputs and outputs are related using a given mapping diagram and determine if a given mapping diagram represents a function.

1/21/14



Function

Not a function

IWBAT define a relation and apply the vertical line test to determine if a relation is a function. I will capture my thinking using the math note catcher including teacher and student-team modeled example problems on the Promethean board. I will demonstrate my understanding on my exit ticket.

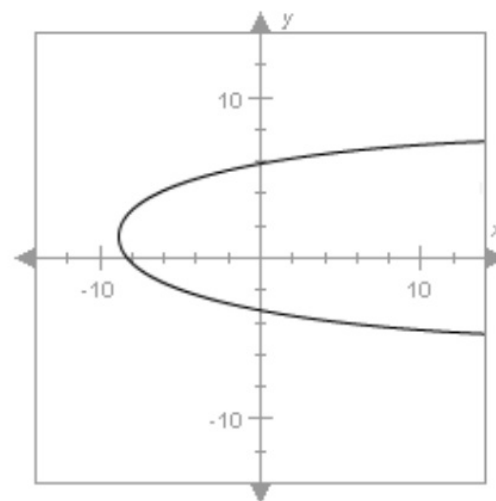
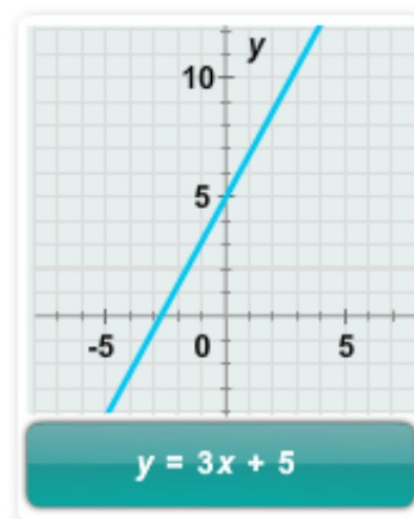
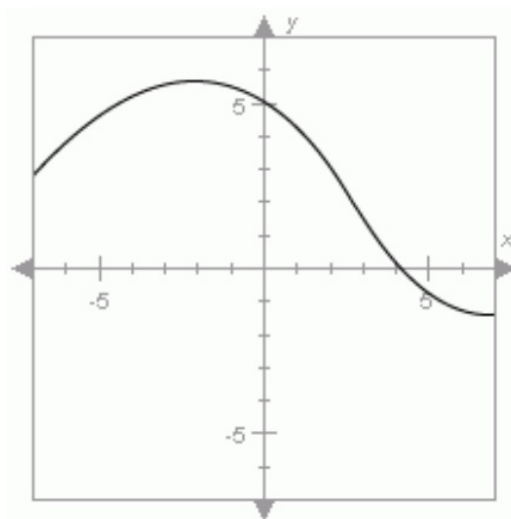
What is a relation?

IWBAT define a relation and apply the vertical line test to determine if a relation is a function.

2.2

Vertical line test

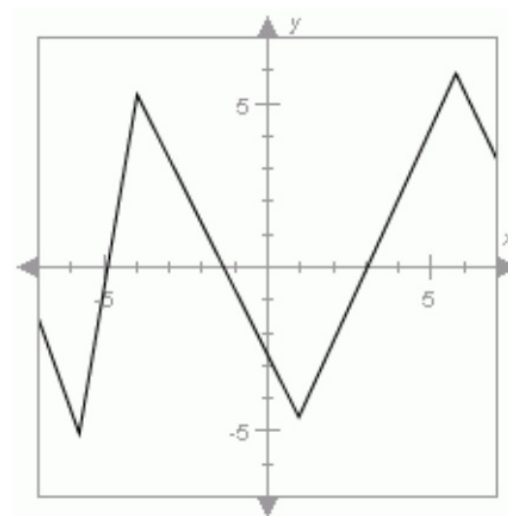
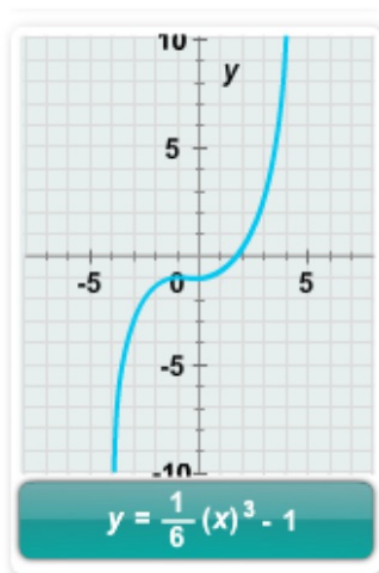
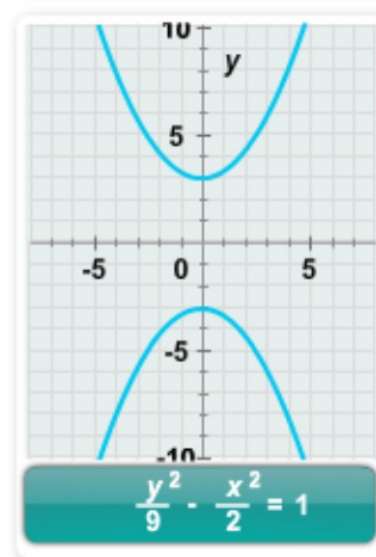
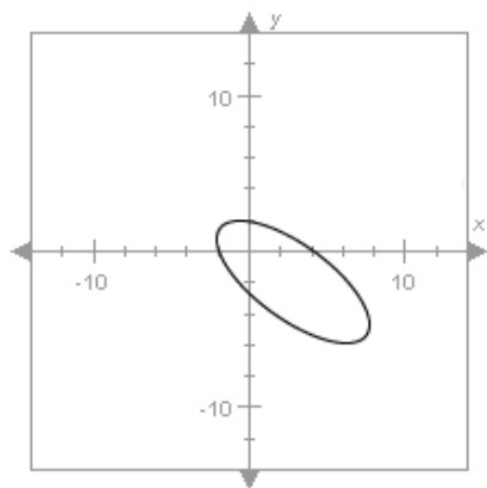
1/21/14



IWBAT define a relation and apply the vertical line test to determine if a relation is a function.

2.2

1/21/14



IWBAT define a relation and apply the vertical line test to determine if a relation is a function.

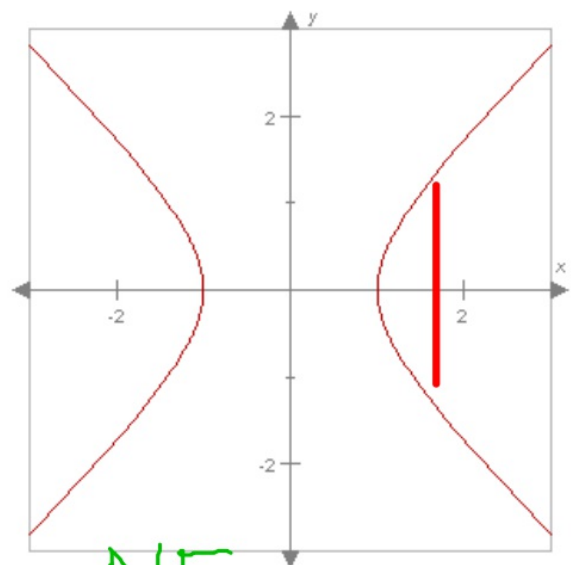
Complete quizzes 2.2.3 & 2.2.4

IWBAT define a relation and apply the vertical line test to determine if a relation is a function.

2.3

1/22/14

Determine function/not a function given an in/out table or a graph.

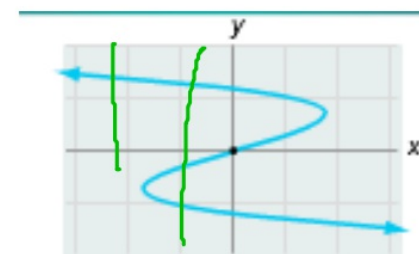


NF
✓

correct!!!
A



A



NF

x	y
0	5
1	6
2	7
3	8
4	9

F

2.3

1/22/14

Define domain and range

Domain is the input values for a relation
X-values

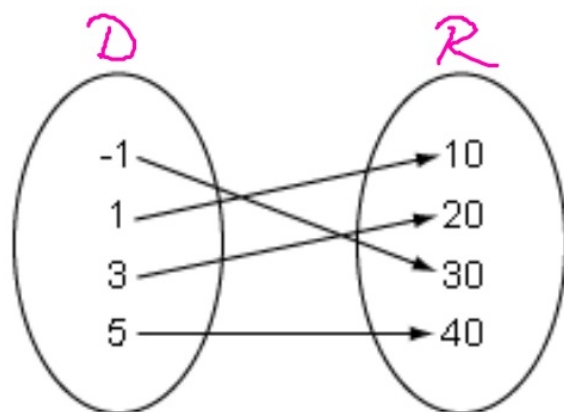
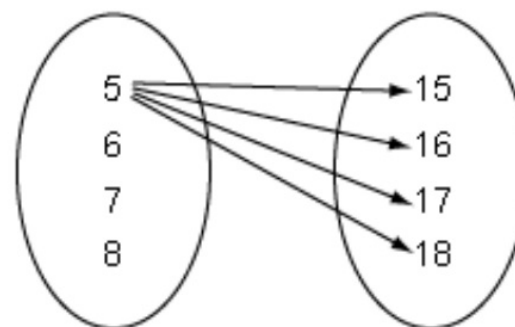
Range is the output values for a relation
Y-values

all Real numbers (pos., neg., zero)

IWBAT identify the elements of domain and range given a mapping diagram or a graph. I will capture my thinking using the math note catcher including teacher and student-team modeled example problems on the Promethean board. I will demonstrate my understanding on my exit ticket.

2.3

1/22/14

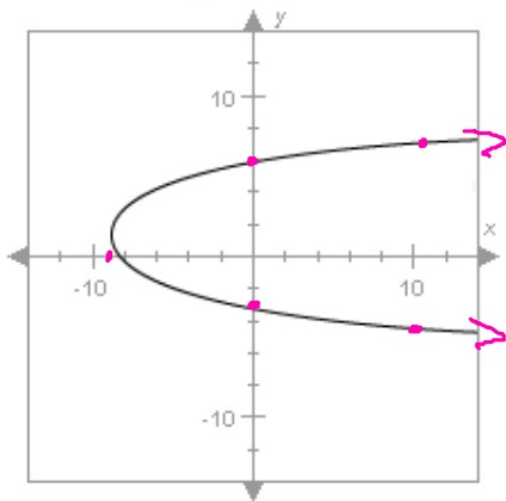
 $D: -1, 1, 3, 5$ $R: 10, 20, 30, 40$ $(-1, 30)$ $(1, 10)$  $D: 5$ $R: 15, 16, 17, 18$ $(5, 15)$ $(5, 16)$

IWBAT identify the elements of domain and range given a mapping diagram or a graph.

2.3

$$x = y^2$$

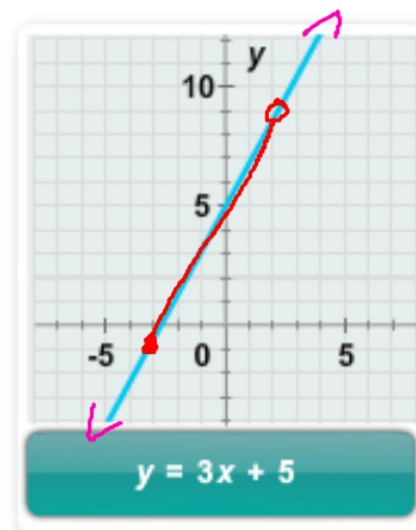
$(0, 5)$
 $(0, 3)$
 $(10,)$
 $(10,)$



D: $x \geq -9$

R: all Real numbers

1/22/14



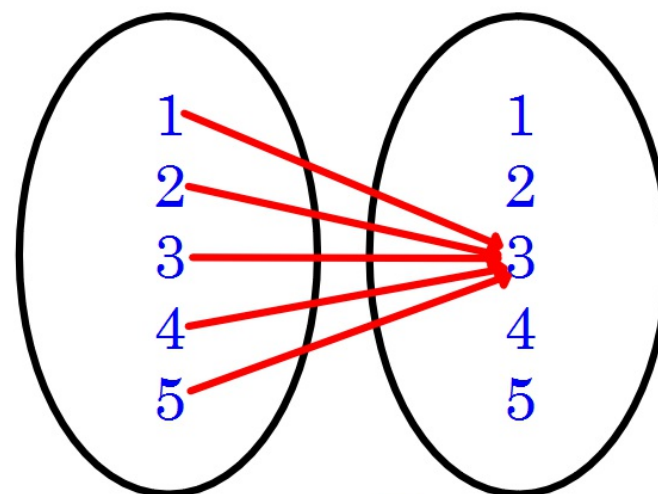
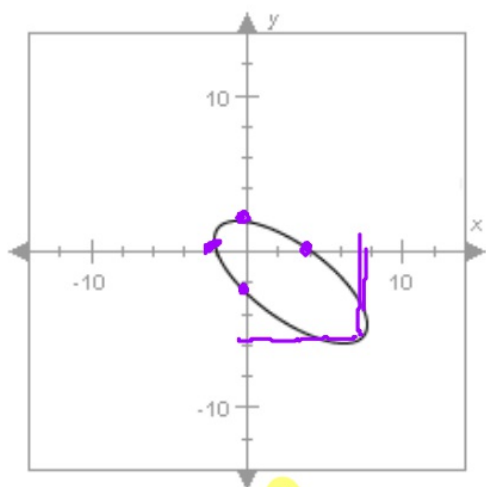
D: $-3 \leq x < 2$
R: $-1 \leq y < 9$



D: all Real numbers

R: all Real numbers

IWBAT identify the elements of domain and range given a mapping diagram or a graph.



$R: -3 \leq y \leq 1$

$D: 1 \leq x \leq 4$

3

$D: 1, 2, 3, 4, 5$

IWBAT identify the elements of domain and range given a mapping diagram or a graph.

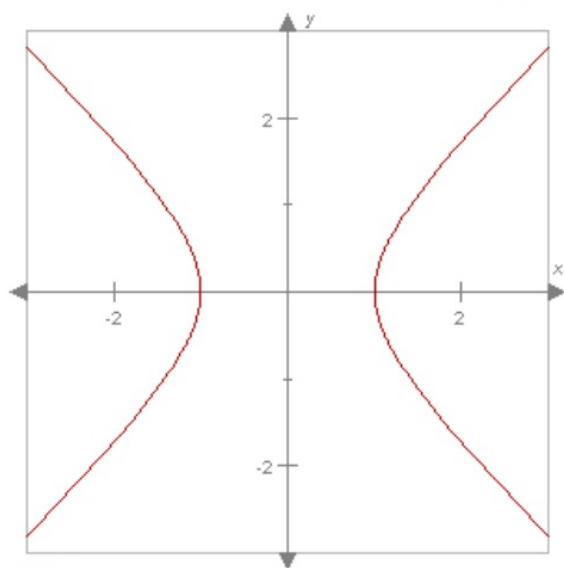
Complete quiz 2.3.3

IWBAT identify the elements of domain and range given a mapping diagram or a graph.

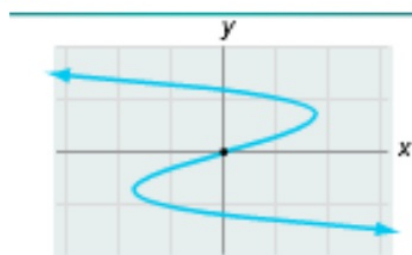
2.4

1/23/14

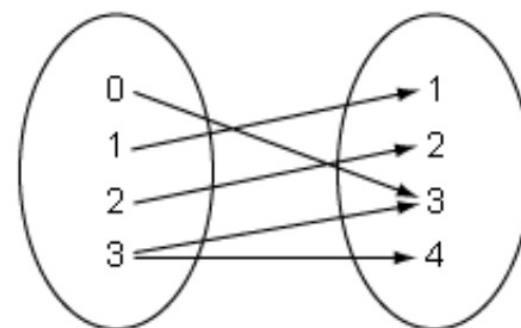
Identify domain & range given a graph or mapping diagram.



$D: x \geq 0$ and $x \leq -1$
 $R: \text{all Real numbers}$



$D: \text{all Real numbers}$
 $R: \text{all Real numbers}$



$D: 0, 1, 2, 3$
 $R: 1, 2, 3, 4$

I will collect your notes for today at the end of class.

2.4

Define composite function including function notation

1/23/14

Composite Function - a function made from different functions

$f(x)$ f depends on x

$g(t)$ g of t

height(^{input}sun)
independent

$f(g(t))$ f depends on g depends on t

IWBAT identify the composite function formed by two simple functions, identify the simple functions which make up a composite function, and identify the independent variable and the sequence of dependent functions in a composition. I will capture my thinking using the math note catcher including teacher and student-team modeled example problems on the Promethean board. I will demonstrate my understanding on my exit ticket.

2.4

1/23/14

Convert 2 gallons to cups.

1 gallon = 4 quarts , 2 half-gallons

1 half-gallon = 2 quarts

1 quart = 4 cups

$$Q(g) = 4g$$

$$C(q) = 4q$$

$$C(Q(g)) = 4(4g) = 16g$$

$$C(Q(2)) = 16(2) = 32 \text{ cups}$$

IWBAT identify the composite function formed by two simple functions, identify the simple functions which make up a composite function, and identify the independent variable and the sequence of dependent functions in a composition.

2.4

Find $f(g(x))$ and $g(f(x))$.

1/23/14

$$\underline{f(x)} = x^2$$

$$\underline{g(x)} = x - 4$$

$$f(g(x)) = (x - 4)^2$$

$$g(f(x)) = (x^2) - 4$$

IWBAT identify the composite function formed by two simple functions, identify the simple functions which make up a composite function, and identify the independent variable and the sequence of dependent functions in a composition.

2.4

1/23/14

Find $f(g(x))$ and $g(f(x))$.

$$\underline{f(x)} = \sqrt{x}$$

$$\underline{g(x)} = 3x^3 - 6$$

$$f(g(x)) = \sqrt{3x^3 - 6}$$

$$\underline{f(x)} = \sqrt{x}$$

$$\underline{g(x)} = 3x^3 - 6$$

$$g(f(x)) = 3(\sqrt{x})^3 - 6$$

IWBAT identify the composite function formed by two simple functions, identify the simple functions which make up a composite function, and identify the independent variable and the sequence of dependent functions in a composition.

Please turn your notes for today in to me.

Define "composite function".

A Combination of different functions .

to form a single function

IWBAT identify the composite function formed by two simple functions, identify the simple functions which make up a composite function, and identify the independent variable and the sequence of dependent functions in a composition.

Pick up your notes from yesterday.

Explain the dependencies of the following composite functions.

$$C(Q(g))$$

$$a(v(t))$$

IWBAT identify the composite function formed by two simple functions, identify the simple functions which make up a composite function, and identify the independent variable and the sequence of dependent functions in a composition.

2.4

Find $f(g(x))$ and $g(f(x))$.

1/24/14

$$\underline{f(x)} = \sqrt{x+7} \quad \underline{g(x)} = x-2$$

$$f(g(x)) = \sqrt{(x-2)+7}$$

$$g(f(x)) = (\sqrt{x+7}) - 2$$

IWBAT identify the composite function formed by two simple functions, identify the simple functions which make up a composite function, and identify the independent variable and the sequence of dependent functions in a composition.

2.4

Find $f(g(x))$ and $g(f(x))$.

1/24/14

$$\underline{f(x) = 3x^2}$$

$$\underline{g(x) = 1}$$

$$f(g(x)) = 3(1)^2 = 3$$

$$g(f(x)) = 1$$

IWBAT identify the composite function formed by two simple functions, identify the simple functions which make up a composite function, and identify the independent variable and the sequence of dependent functions in a composition.

$$\underline{f(x) = x^2}$$

$$\underline{g(x) = 4x^2}$$

$$f(g(x)) = (4x^2)^2 = 16x^4$$

$$g(f(x)) = 4(x^2)^2 = 4x^4$$

$$f(g(x)) = g(f(x))$$

False

always

$$f(x) = 5x^2$$

$$g(x) = 2x^3$$

$$f(g(x)) = 5(2x^3)^2 = 5 \cdot 4x^6 = 20x^6$$

$$f(x) = 5x^2$$

$$g(x) = 2x^3$$

$$g(f(x)) = 2(5x^2)^3 = 2 \cdot 125x^6 = 250x^6$$

2.4

Identify $f(x)$ and $g(x)$ from the following $g(f(x))$:

1/24/14

$$g(f(x)) = x^3 - 5$$

$$f(x) = x^3$$

$$g(x) = x - 5$$

$$g(f(x)) = 3(x+1)^2$$

$$f(x) = x+1$$

$$g(x) = 3x^2$$

IWBAT identify the composite function formed by two simple functions, identify the simple functions which make up a composite function, and identify the independent variable and the sequence of dependent functions in a composition.

2.4

Identify $f(x)$ and $g(x)$ from the following $g(f(x))$:

1/24/14

$$g(f(x)) = 3\sqrt{x} + 2 \quad 3(f(x))$$

$$f(x) = \sqrt{x} \quad \sqrt{x} + \frac{2}{3}$$

$$g(x) = 3x + 2 \quad 3x$$

$$g(f(x)) = (x-5)^3 + (x-5)$$

$$f(x) = x-5$$

$$g(x) = x^3 + x$$

IWBAT identify the composite function formed by two simple functions, identify the simple functions which make up a composite function, and identify the independent variable and the sequence of dependent functions in a composition.

$$g(f(x)) = (x-3)^3 + 6$$

$$f(x) = x-3$$

$$g(x) = x^3 + 6$$

$$g(f(x)) = (x-3)^3 + x-3$$

$$f(x) = x-3$$

$$g(x) = x^3 + x$$

Complete quiz 2.4.3.

IWBAT identify the composite function formed by two simple functions, identify the simple functions which make up a composite function, and identify the independent variable and the sequence of dependent functions in a composition.

1/24/14

****MAP math challenge****

- Work with a partner
- Complete as many as you can without outside help
- Due when you get to class on Tuesday, 1/28/14
- Best score per group gets a prize

Scoring

- Column with the arrow: 5 pts each correct
- Columns to the left: 4 pts, 3 pts, etc.
- Columns to the right: 10 pts, 15 pts, etc.

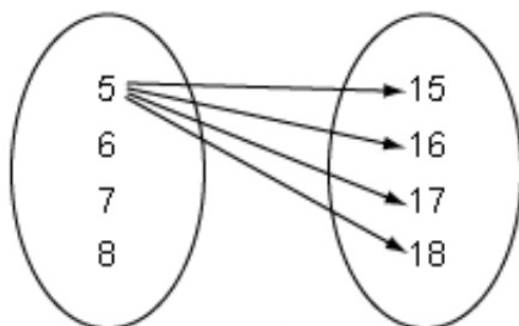
What do these terms mean?

Function a relation that has one output for each input

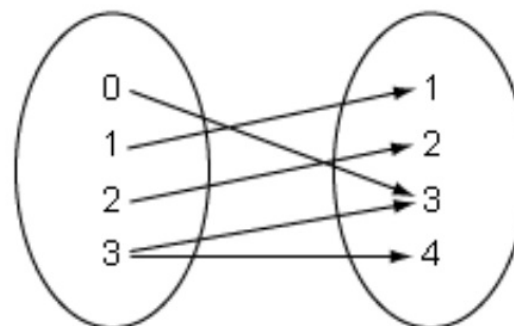
Relation two sets of numbers related in some way, an ordered pair

Independent Variable inside the parentheses
Input function notation

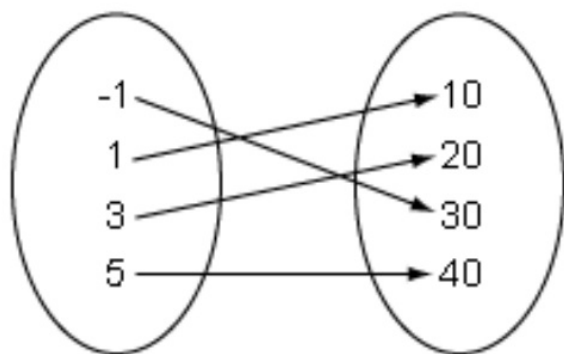
Dependent Variable
outside the parentheses of function notation
depends on the independent variable
output



Not a function



Not a function



Function

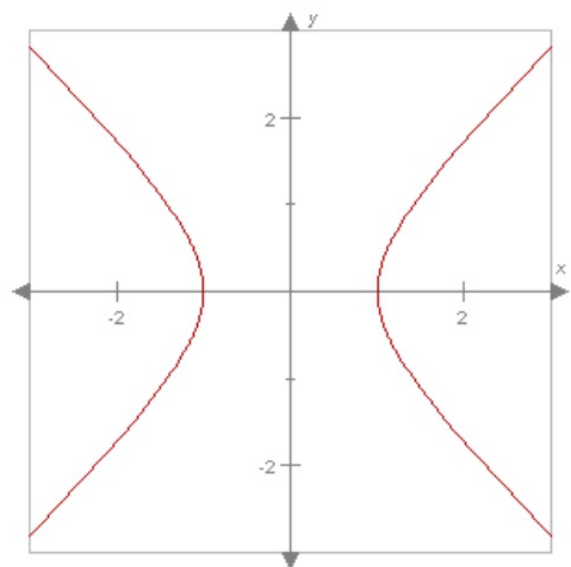
Function

Not a function

Unit 2 Review

1/27/14

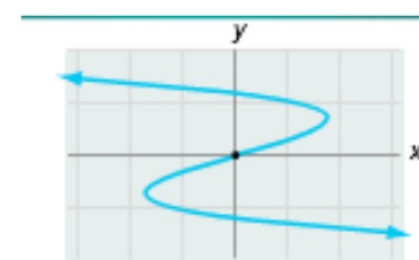
Determine function/not a function given an in/out table or a graph.



Not a function



Function



Not a function

Function

Function

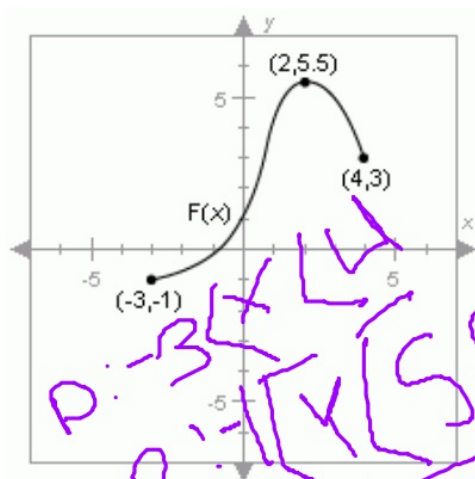
x	y
0	5
1	6
2	7
3	8
4	9

Not a function

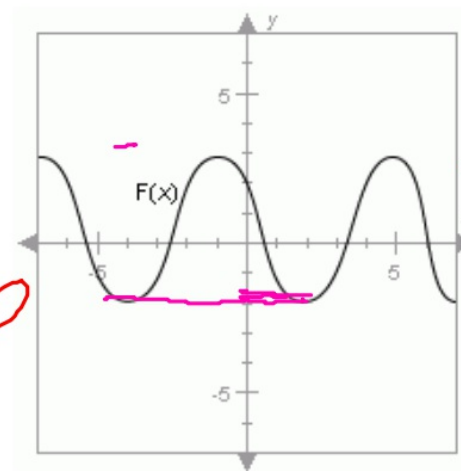
Unit 2 Review

1/27/14

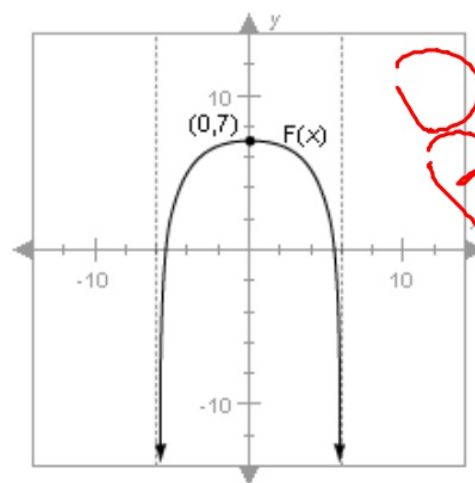
Name the domain and range for each.



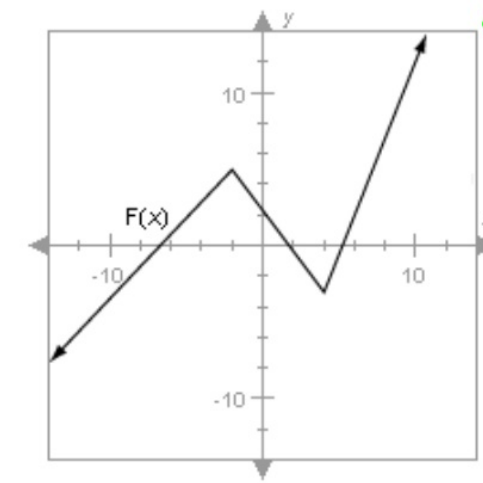
D: $[-3, 4]$
R: $[-1, 5.5]$



D: All real #s
R: $[-3, 3]$



D: $[-4, 4]$
R: $[-10, 7]$



D: All Real Numbers
R: All Real Numbers

Unit 2 Review Composition of functions 1/27/14

For each pair of $f(x)$ and $g(x)$, give $g(f(x))$ and $f(g(x))$.

$$\begin{aligned} \underline{F(x)} &= x^2 + 4 \\ \underline{G(x)} &= 2(x+1) \end{aligned}$$

$$f(g(x)) = (2(x+1))^2 + 4$$

$$g(f(x)) = 2(x^2 + 4) + 1$$

$$\begin{aligned} \underline{F(x)} &= x+6 \\ \underline{G(x)} &= x^2 - 1 \end{aligned}$$

$$f(g(x)) = (x^2 - 1) + 6$$

$$g(f(x)) = (x+6)^2 - 1$$

$$\begin{aligned} \underline{F(x)} &= 2x \\ \underline{G(x)} &= x+1 \end{aligned}$$

$$\begin{aligned} f(g(x)) &= 2(x+1) \\ G(F(x)) &= (2x) + 1 \end{aligned}$$

$$f(x) = 3x$$

$$g(x) = 4x + 2$$

$$f(g(x)) = 3(4x + 2)$$

$$g(f(x)) = 4(3x) + 2$$

~~AX~~

Unit 2 Review

1/27/14

Which of the following will form the composite function $G(F(x))$ shown below?

$$G(F(x)) = \sqrt{3(x+1)}$$

☐ A. $F(x) = \sqrt{x} + 1$ and $G(x) = 3x$

☐ B. $F(x) = 3x$ and $G(x) = \sqrt{x} + 1$

☒ C. $F(x) = x + 1$ and $G(x) = \sqrt{3x}$

~~☐ D. $F(x) = \sqrt{3x}$ and $G(x) = 1$~~

$$G(F(x)) = 7\sqrt{x+1}$$

☒ A. $F(x) = \sqrt{x+1}$ and $G(x) = 7x$

~~☐ B. $F(x) = x$ and $G(x) = \sqrt{7}$~~

~~☐ C. $F(x) = \sqrt{x}$ and $G(x) = 7$~~

☐ D. $F(x) = 7x$ and $G(x) = \sqrt{x+1}$

What is the domain of the composite function $G(F(x))$?

$$F(x) = x - 2, G(y) = \frac{1}{y}$$

*fraction - denominator
Cannot equal zero*

$$G(F(x)) = \frac{1}{x-2}$$

$$\begin{array}{r} x - 2 = 0 \\ + 2 \quad + 2 \\ \hline x = 2 \end{array}$$

☐ A. $x > 2$

☒ B. $x \leq 2$

☒ C. All real numbers

☐ D. All real numbers except 2

What is the domain of the composite function $G(F(x))$?

$$F(x) = x + 4, G(y) = \frac{1}{y}$$

$$G(F(x)) = \frac{1}{x+4}$$

$$\begin{aligned} x + 4 &= 0 \\ -4 & \quad -4 \\ x &= -4 \end{aligned}$$

☐ A. $x > 4$

☐ B. $x \leq 4$

☐ C. All real numbers

☒ D. All real numbers except -4

Unit 2 Review

1/28/14

What is the domain of the composite function $G(F(x))$?

$$F(x) = 2x, G(y) = \frac{1}{y}$$

$$G(F(x)) = \frac{1}{2x}$$

$$\frac{2x}{2} = \frac{0}{2}$$
$$x = 0$$

☐ ~~A. $x > 2$~~

☐ B. $x \leq 0$

☐ ~~C. All real numbers~~

☒ D. All real numbers except 0

Unit 2 Review

1/28/14

Over the set of real numbers, what is the domain of the composite function $G(F(x))$?

$$F(x) = -x - 3, G(y) = \sqrt{y}$$

$$G(F(x)) = \sqrt{-3 - x}$$

☐ A. $x > -3$

☒ B. $x \leq -3$

☐ C. $x \geq -3$

☐ D. All real numbers

$$\begin{aligned} -3 - x &= 0 \\ +x &+x \\ -3 &= x \end{aligned}$$

Square root - cannot take the square root of a negative

$$-3 + (+2) = -1$$

$$-3 + (+4) = 1$$

Domain & Range Review

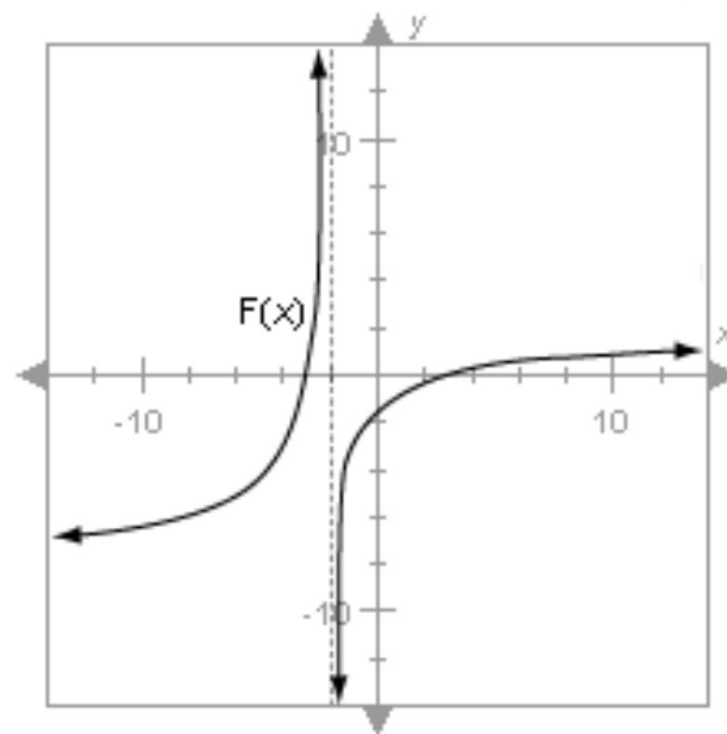
1/31/14

domain -

range -

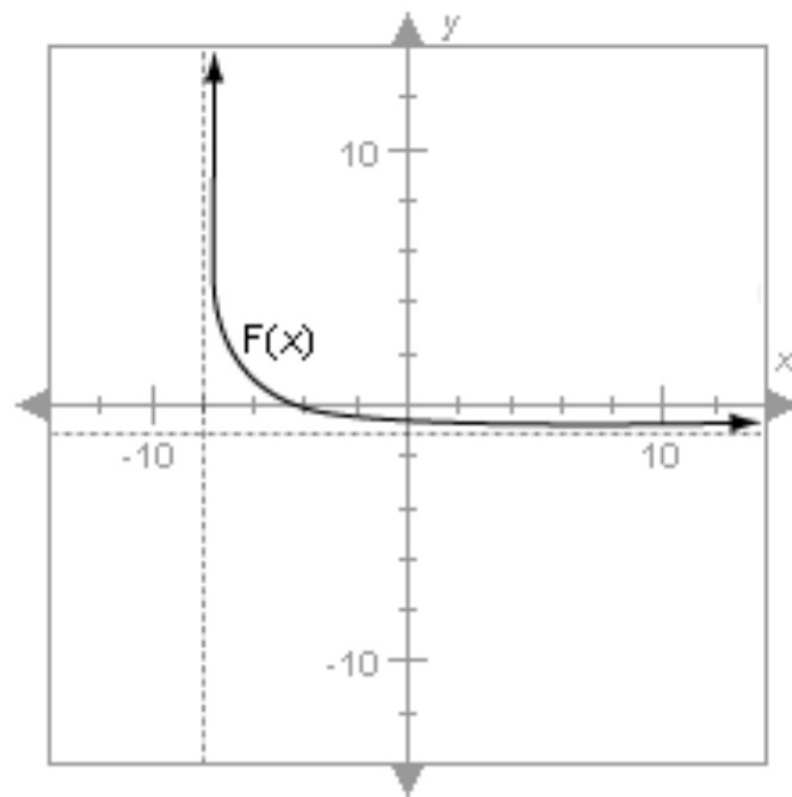
Domain & Range Review

1/31/14



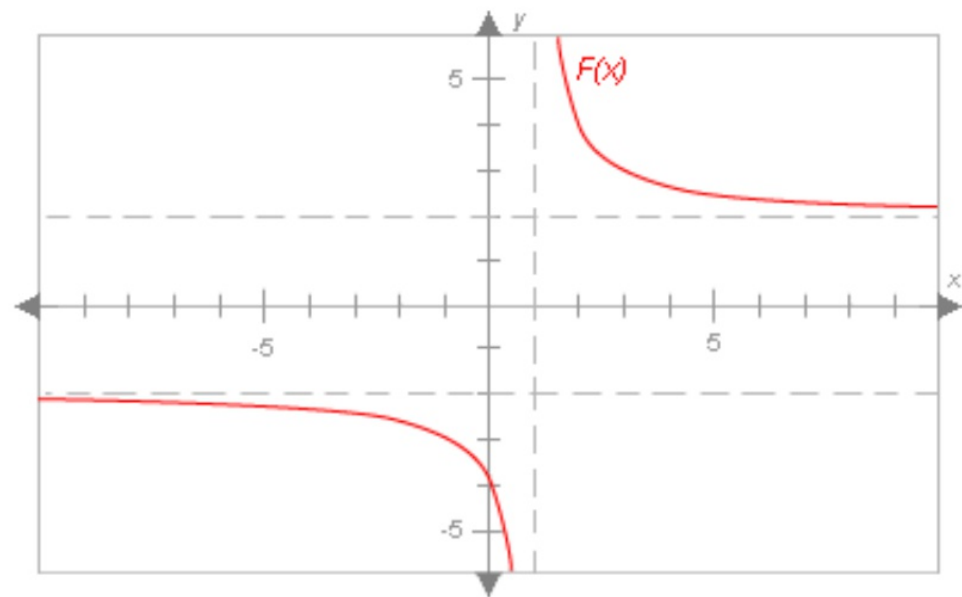
Domain & Range Review

1/31/14



Domain & Range Review

1/31/14



independent

dependent (independent)

dependent

The value of certain antique furniture
depends on the year in which it was made.

Composition of Functions Review

1/31/14

Find $f(g(x))$.

$$f(x) = x^2 + 2$$

$$g(x) = x^2 - 2$$

Find $g(f(x))$.

$$f(x) = x^2 + 2$$

$$g(x) = x^2 - 2$$

Composition of Functions Review

1/31/14

Find $f(g(x))$.

$$f(x) = x^2 + 4$$

$$g(x) = 2(x + 1)$$

Find $g(f(x))$.

$$f(x) = x^2 + 4$$

$$g(x) = 2(x + 1)$$

Composition of Functions Review

1/31/14

Find $f(g(x))$.

$$f(x) = x + 2$$

$$g(x) = 3x^4$$

Find $g(f(x))$.

$$f(x) = x + 2$$

$$g(x) = 3x^4$$

Complete or correct your Unit 2 test.

If correcting, you need to explain why your new answer is the correct answer with a complete sentence.